

CLAIMS

Listing of Claims:

1. (Currently Amended) A wave power apparatus comprising:
a plurality of buoyant elongate body members, at least one adjacent pair of body members being interconnected by a linkage unit to form an articulated chain, each body member of said pair being connected to the respective linkage unit by linkage means permitting relative rotation of the body members;
power extraction means adapted to resist and extract power from the relative rotation, the power extraction means being located substantially within each linkage unit;
wherein each linkage unit is arranged to permit relative rotation between the linkage unit and a first body member about a first axis of rotation at only a first end of the linkage unit, and to permit relative rotation between the linkage unit and a second body member about a second axis of rotation only at a second end of the linkage unit;
wherein the first and second axes of rotation are mutually orthogonal.
2. (Previously Presented) An apparatus as claimed in claim 1, wherein the body members are arranged consecutively in an articulated apparatus, each adjacent pair of body members being interconnected by a linkage unit to form an articulated chain.
3. (Previously Presented) An apparatus as claimed in claim 1, wherein the or each linkage unit has a longitudinal length substantially shorter than the body members.
4. (Previously Presented) An apparatus as claimed in claim 1, in which the body members substantially comprise hollow members devoid of active components.
5. (Previously Presented) An apparatus as claimed in claim 1, wherein each body member has one or more end caps with corresponding linkage means to marry with the linkage means of the linkage unit.
6. (Previously Presented) An apparatus as claimed in claim 1, wherein the power extraction means includes a hydraulic ram assembly.
7. (Previously Presented) An apparatus as claimed in claim 6, wherein the hydraulic ram assembly comprises a plurality of rams.
8. (Previously Presented) An apparatus as claimed in claim 6, wherein the power extraction means includes a hydraulic ram assembly for each axis of rotation.

9. (Previously Presented) An apparatus as claimed in claim 8, wherein the power extraction means includes two hydraulic ram assemblies acting about each axis of rotation.

10. (Previously Presented) An apparatus as claimed in claim 5, wherein the end caps have a number of cavities to receive respective ends of the power extraction means.

11. (Previously Presented) An apparatus as claimed in claim 1, wherein the power extraction means has at least one seal to prevent ingress of water into the linkage unit and/or body members.

12. (Previously Presented) An apparatus as claimed in claim 1, wherein the linkage unit includes one or more power generation or storage means connected to one or more of the power extraction means.

13. (Previously Presented) An apparatus as claimed in claim 12, wherein the linkage unit includes a first power generation means connected to one or more power extraction means at one axis of rotation, and a second power generation means connected to one or more power extraction means at the other axis of rotation.

14. (Previously Presented) An apparatus as claimed in claim 13, wherein the first or second power generation means is connectable to at least one power extraction means from each axis of rotation, such that the restraint of the linkage unit is maintained in the event of failure of one of the power extraction or generation means.

15. (Previously Presented) An apparatus as claimed in claim 13, wherein the first and second power generation means is connectable to one or more of the power extraction means from one or both axes of rotation, such that when the apparatus is operating at partial capacity, the one or more power extraction means is connected solely to the first or second power generation means.

16. (Previously Presented) An apparatus as claimed in claim 1, wherein constraint is applied to each power extraction means of the linkage unit in order to induce a cross-coupled response which may be tuned to be resonant in small waves to increase power capture and which may be set in large waves to limit power absorption and maximise survivability.

17. (Previously Presented) An apparatus as claimed in claim 1, wherein the apparatus includes one or more of a ballasting system, mooring system, and means to apply a roll bias angle to the axes of rotation.

18. (Previously Presented) An apparatus as claimed in claim 1, wherein the linkage unit includes access means, such as one or more hatches, to allow inspection, repair and maintenance on or off site.

19. (Currently Amended) A linkage unit for use in a wave power apparatus including a plurality of buoyant elongate body members, the linkage unit comprising:

linkage means for interconnection between the body members permitting relative rotation at either end of the unit;

power extraction means adapted to resist and extract power from the relative rotation of the body members;

the power extraction means being located substantially within the linkage unit; and

wherein the linkage unit is arranged to permit relative rotation between the linkage unit and a first body member about a first axis of rotation only at a first end of the linkage unit, and to permit relative rotation between the linkage unit and a second body member about a second axis of rotation only at a second end of the linkage unit;

wherein the first and second axes of rotation are mutually orthogonal.

20. (Original) A linkage unit as claimed in claim 19, wherein the power extraction means includes a hydraulic ram assembly.

21. (Previously Presented) A linkage unit as claimed in claim 20, wherein the hydraulic ram assembly comprises a plurality of rams.

22. (Original) A linkage unit as claimed in claim 21, wherein the power extraction means includes a hydraulic ram assembly for each axis of rotation.

23. (Original) A linkage unit as claimed in claim 22, wherein the power extraction means includes two hydraulic ram assemblies acting about each axis of rotation.

24. (Previously Presented) A linkage unit as claimed in claim 19, wherein the power extraction means has at least one seal to prevent ingress of water into the linkage unit and/or body members.

25. (Previously Presented) A linkage unit as claimed in claim 19, wherein the linkage unit includes one or more power generation or storage means connected to one or more of the power extraction means.

26. (Original) A linkage unit as claimed in claim 25, wherein the linkage unit includes a first power generation means connected to one or more power extraction means at one axis of rotation, and a second power generation means connected to one or more power extraction means at the other axis of rotation.

27. (Original) A linkage unit as claimed in claim 26, wherein the first or second power generation means is connectable to at least one power extraction means from each axis of rotation, such that the restraint of the linkage unit is maintained in the event of failure of one of the power extraction or generation means.

28. (Original) A linkage unit as claimed in claim 27, wherein the first and second power generation means is connectable to one or more of the power extraction means from one or both axes of rotation, such that when the apparatus is operating at partial capacity, the one or more power extraction means is connected solely to the first or second power generation means.

29. (Previously Presented) A linkage unit as claimed in claim 19, wherein constraint is applied to each power extraction means of the linkage unit in order to induce a cross-coupled response which may be tuned to be resonant in small waves to increase power capture and which may be set in large waves to limit power absorption and maximise survivability.

30. (Previously Presented) A linkage unit as claimed in claim 19, including access means, such as one or more hatches, to allow inspection, repair and maintenance on site.

31. (Currently Amended) A method of extracting power from waves comprising:
deploying a wave power apparatus, the wave power apparatus comprising:
a plurality of buoyant elongate body members, at least one adjacent pair of body members being interconnected by a linkage unit to form an articulated chain, each body member of said pair being connected to the respective linkage unit by linkage means permitting relative rotation of the body members;

power extraction means adapted to resist and extract power from the relative rotation, the power extraction means being located substantially within each linkage unit;

wherein each linkage unit is arranged to permit relative rotation between the linkage unit and a first body member about a first axis of rotation only at a first end of the linkage unit, and to permit relative rotation between the linkage unit and a second body member about a second axis of rotation only at a second end of the linkage unit;

wherein the first and second axes of rotation are mutually orthogonal;

the method further comprising:

orientating the structure such that a front end of the structure faces into the oncoming waves; and

extracting the power absorbed in the or each linkage unit.

32. (Currently Amended) A method of manufacturing a wave power apparatus including a plurality of buoyant elongate body members, the method comprising:

interconnecting each pair of adjacent body members of the apparatus with a linkage unit, the linkage unit comprising:

linkage means for interconnection between the body members permitting relative rotation at either end of the unit;

power extraction means adapted to resist and extract power from the relative rotation of the body members;

the power extraction means being located substantially within the linkage unit; and

wherein the linkage unit is arranged to permit relative rotation between the linkage unit and a first body member about a first axis of rotation only at a first end of the linkage unit, and to permit relative rotation between the linkage unit and a second body member about a second axis of rotation only at a second end of the linkage unit;

wherein the first and second axes of rotation are mutually orthogonal.

33. (Original) The method of claim 32, wherein the body members and linkage unit (s) are connected together close to or on site.

34. (Original) The method of claim 32, wherein the linkage unit (s) are fully assembled and tested before being transported to site.